

PRODUCT DATA

Outdoor Microphone Unit — Type 4198 Outdoor Microphone Kit — UA-1404

Type 4198 is a weather-proof microphone and preamplifier assembly that meets IEC 61672 class 1 and ANSI S1.4 Type 2 specifications. Use it in any situation where you must make precise outdoor sound measurements.

Type 4198 is even suitable for semi-permanent, unsupervised outdoor installation.

Outdoor Microphone Kit UA-1404 includes all of the protective features of Type 4198, but without the microphone and preamplifier. It enables you to weather-proof your Falcon™ range microphones and preamplifiers. It can also protect the microphones and preamplifiers for Sound Level Meters Types 2236, 2250 and 2260. All recommended combinations fulfil IEC 61672 class 1 and ANSI S1.4 Type 2 specifications (see configuration diagram, Fig. 7).

Both the unit and the kit enable you to take measurements that are protected against the effects of wind, rain, and perching birds.



USES AND FEATURES

USES

- IEC 61672 class 1 compliant outdoor sound measurements in all weather conditions
- Unattended, semi-permanent outdoor installations
- Noise control
- Complaint investigations
- Research

FEATURES

- Protected against the effects of wind, rain, and perching birds
- Easy acoustic calibration

- Detailed free-field corrections on mini CD to obtain flat response in all sound fields
- Falcon™ range product with a 3-year guarantee
- UA-1404 usable with existing Falcon™ range microphones and preamplifiers

TYPE 4198 ALSO FEATURES

- Built-in Type 1 microphone and preamplifier
- Wide dynamic range: 15.2 dB(A) to 146 dB
- Remote calibration monitoring using CIC
- Individual microphone calibration charts
- Easy connection to standard measurement microphone equipment

Effective Protection in Outdoor Environments

Both Outdoor Microphone Unit Type 4198 and Outdoor Microphone Kit UA-1404 use the same protective assembly.

Effective Wind Protection

The windscreen reduces wind noise by approximately 15 dB for wind speeds up to 120 km/h. It is made of a specially prepared porous polyurethane foam, which is resistant to corrosive atmospheres and immune to moisture.

Effective Rain Protection

A rain cover protects the microphone from moisture. The cover surrounds the microphone cartridge inside the wind screen (see Fig. 5). It is specially designed to minimise its effect on the frequency and directional characteristics of the assembly.

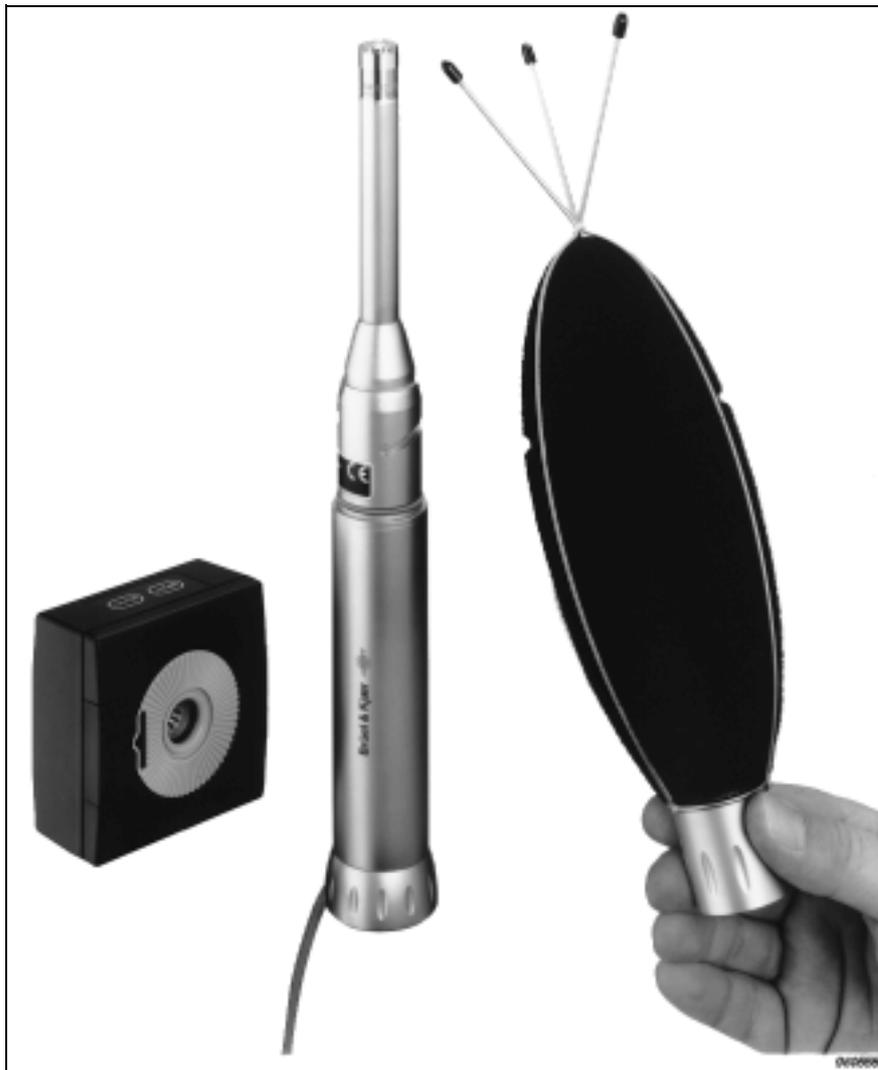
Chemical resistant

All essential components are made of stainless steel to withstand tough environments.

Support and Protection

The windscreen is supported by three stainless steel rods that also protrude as rubber-capped spikes, which prevent birds from perching on the microphone. Each of the bird spikes is capped with soft rubber to make them easier to see and to help prevent eye injuries (see Fig. 5).

Fig. 1
The wind and rain cover can be removed easily, but not accidentally. This exposes the microphone for easy calibration



Long Lasting

The unit provides excellent long-term mechanical stability. Should the frame become bent or the foam worn-out, replacements are available.

Easy Acoustic Calibration

Many all-weather microphone systems provide durability at the expense of microphone accessibility, which makes acoustical calibration difficult. With Type 4198 and UA-1404, the windscreen and rain cover assembly can easily be removed, thus exposing the microphone for easy acoustical calibration (see Fig. 5).

Fig. 2
Frequency response of Outdoor Microphone Unit Type 4198. IEC 61672 class 1 tolerances are shown above and below the response curve

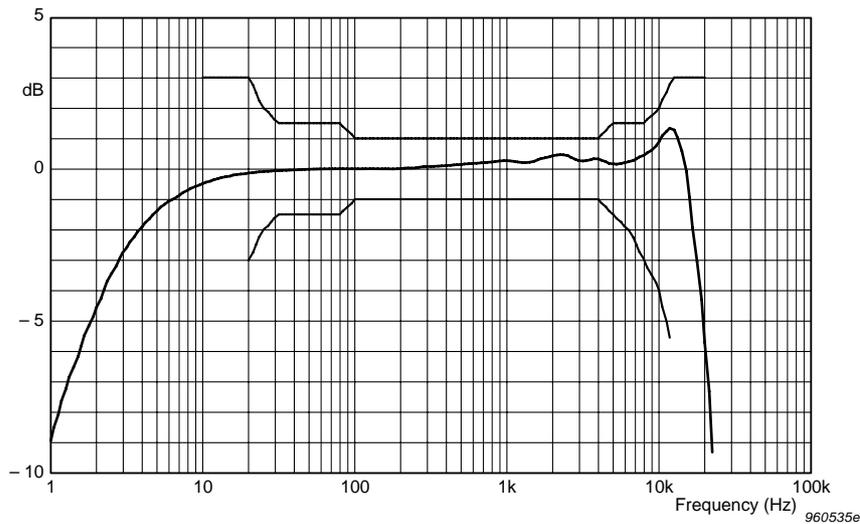


Fig. 3
Change in frequency response of Type 4188 microphone with Outdoor Microphone Kit UA-1404 (including the effect of the replacement grid)

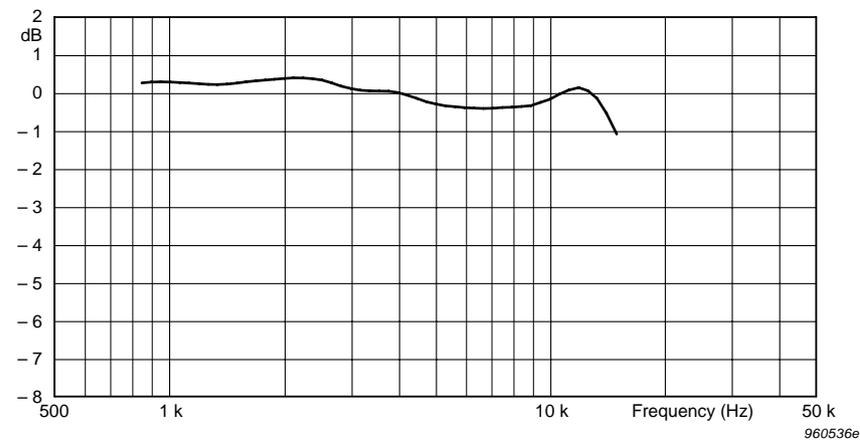
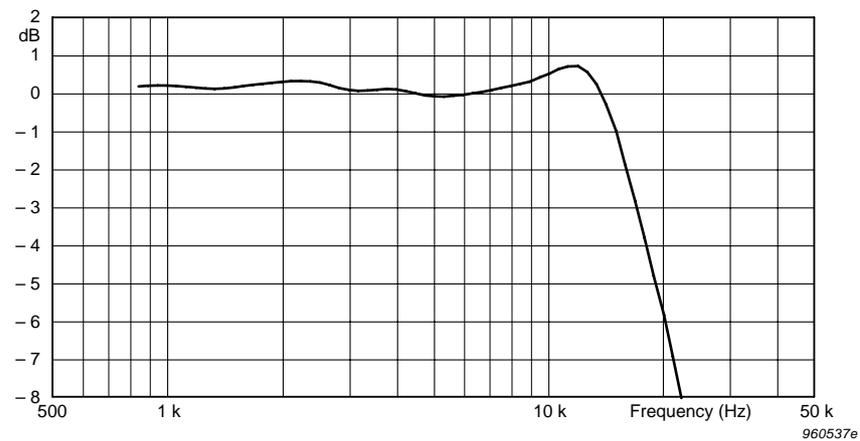
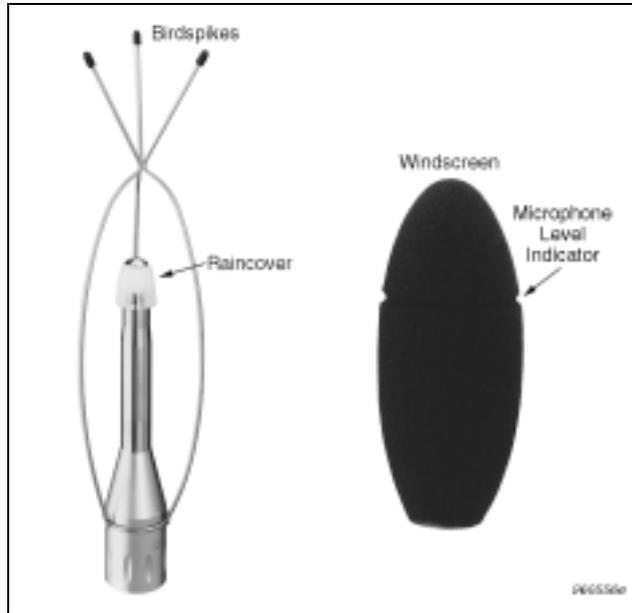


Fig. 4
Change in frequency response of Types 4189 and 4190 microphones with Outdoor Microphone Kit UA-1404 (including the effect of the replacement grid)



Unattended Outdoor Monitoring

Fig. 5
The weather protection components of Type 4198 and UA-1404



All of the features of Type 4198 and UA-1404 combine to create an assembly that can safely be installed for semi-permanent outdoor sound measurement. The assembly will maintain consistent performance even when left unattended in bad weather for several weeks.

Precise Microphone Placement

The height of the microphone inside the windscreen is clearly marked by the groove moulded into the screen (see Fig. 5).

Type 4198 — The Complete Outdoor Microphone

Precision Components

Outdoor Microphone Type 4198 includes the following components:

- Falcon Range Prepolarized Free-field 1/2" Microphone Type 4189
- Falcon Range 1/2" Microphone Preamplifier Type 2669-C
- Outdoor Microphone Kit UA-1404
- 10 meter extension cable AO-0414-D-100

Type 1 Microphone Cartridge

The Type 4198 includes a Falcon Range Prepolarized Free-field 1/2" Microphone Type 4189. Type 4189 is a rugged microphone that ensures high stability under a variety of conditions. Its stainless steel alloy diaphragm withstands even polluted industrial environments.

During manufacturing, each microphone is artificially aged at a high temperature to ensure good long-term stability.

Type 1 Preamplifier

Falcon Range Preamplifier Type 2669-C operates over a wide range of temperatures, humidity levels and other environmental conditions. Type 2669-C is especially well-suited for outdoor monitoring because of its ability to work with very long cables. It provides an extremely wide frequency and dynamic range with low noise.

Save Time and Expense with CIC

Brüel & Kjær's patented Charge Injection Calibration (CIC) facility is built into the preamplifier. It enables you to remotely monitor the microphone system for impedance changes, which can indicate a need for recalibration or repair. This will extend the period between acoustical

calibrations, thus saving you time and expense. For more information about CIC, see the Brüel & Kjær Microphone Handbook (BA 5105).

Individual Calibration

Each unit comes with individual calibration charts and a mini CD containing detailed free-field corrections to the actuator response. The corrections are supplied as comma separated ASCII text files.

Obtain Flat Response in All Fields

The information contained on the mini CD enables you to make extremely precise free-field measurements. When you are performing detailed frequency analysis, this information will enable you to adjust your readings to obtain a flat microphone response in any sound field.

Use Your Existing Equipment Outdoors with UA-1404

Outdoor Microphone Kit UA-1404 includes all of the weather protection equipment of Outdoor Microphone Type 4198 (windscreen, rain cover, bird spikes, and stainless steel enclosure). The kit is compatible with the following Brüel & Kjær equipment:

- Falcon Range Microphone Types 4188, 4189, and 4190
- Falcon Range Preamplifier Types 2671 and 2669-B/L/C
- Microphone and preamplifier from Hand-held Analyzer Type 2250
- Microphone and preamplifier from Sound Analyzer Type 2260
- Microphone and preamplifier from Sound Level Meter Type 2236 (see “Type 2236 Considerations” below)

The kit will enable you to use your existing equipment to make outdoor measurements, even unattended or in bad weather.

The kit includes two stainless steel 1/2" replacement microphone grids, which are required to obtain the correct frequency response. One is for use with microphone Type 4188 and the other for Types 4189 and 4190. They also help protect your microphone cartridge from corrosion.

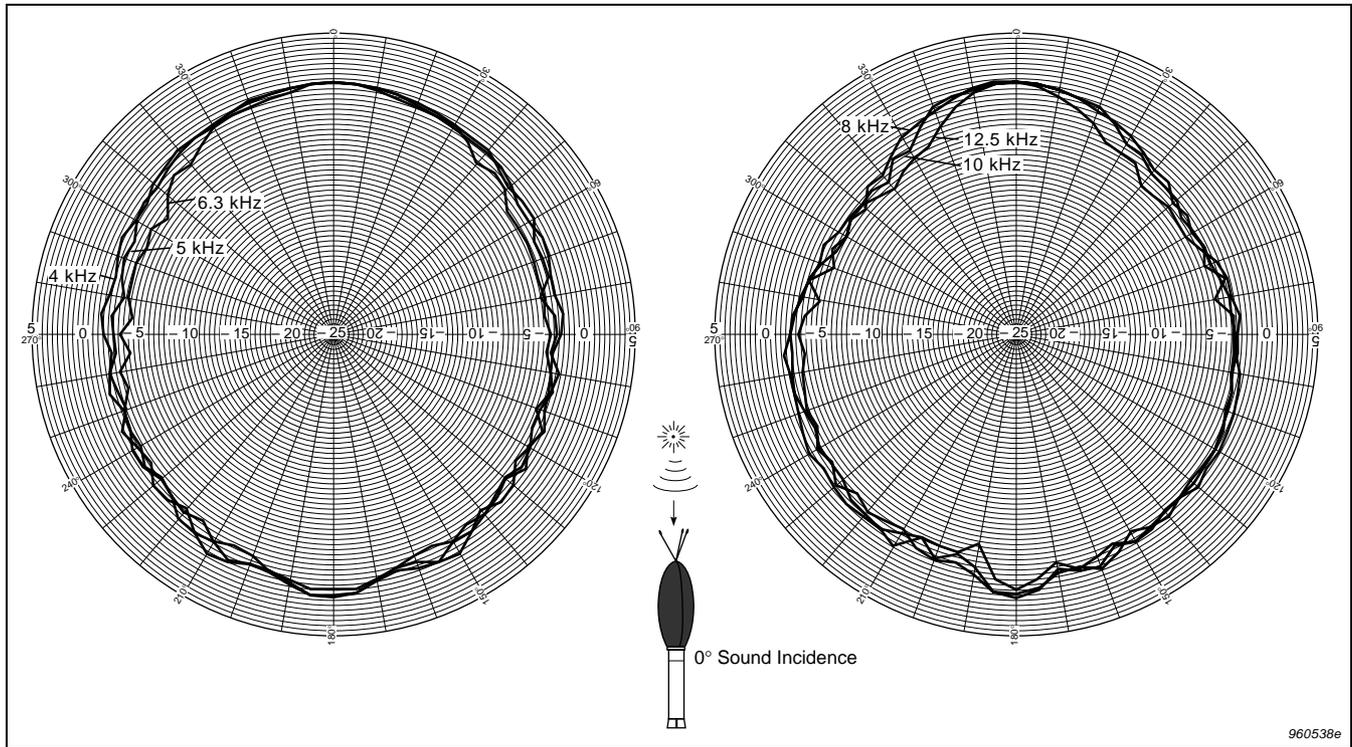
Obtain Flat Response in All Fields

Like Type 4198, UA-1404 includes a disc containing detailed free-field corrections for each microphone recommended for use with the kit. See the Type 4198 section above for more information.

Type 2236 Considerations

UA-1404 extends the distance between the microphone and the preamplifier. This causes a 2 dB loss in the sound signal, which may invalidate your instrument's calibration. You must therefore check the chart that came with your Type 4188 microphone. Make sure the sensitivity is between –30.5 dB and –28 dB before using UA-1404 with your instrument. If the sensitivity lies below –30.5 dB, then you must purchase a more sensitive Type 4188 microphone to use with UA-1404.

Fig. 6 Directional characteristics for both Type 4198 and UA-1404



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Compliance with Standards

	CE-mark indicates compliance with: EMC Directive and Low Voltage Directive. C-Tick mark indicates compliance with the EMC requirements of Australia and New Zealand.
Safety	EN/IEC 61010-1: Safety requirements for electrical equipment for measurement, control and laboratory use. UL 61010-1: Standard for Safety – Electrical measuring and test equipment.
EMC Immunity	EN/IEC 61000-6-1: Generic standards – Immunity for residential, commercial and light industrial environments. EN/IEC 61000-6-2: Generic standards – Immunity for industrial environments. Note: The above is guaranteed only with extension cables AO-0414, AO-0415 and AO-0416.
Temperature	IEC 60068-2-1 & IEC 60068-2-2: Environmental Testing. Cold and Dry Heat. Operating Temperature: -20 to +60°C (-4 to +140°F), (150°C (302°F) with increase in noise) Storage Temperature: -25 to +70°C (-13 to +158°F)
Humidity	IEC 60068-2-78: Damp Heat: 95% RH (non-condensing at 40°C (104°F))
Mechanical	Non-operating: IEC 60068-2-6: Vibration: 0.3 mm, 20 m/s ² , 10–500 Hz IEC 60068-2-27: Shock: 1000 m/s ² IEC 60068-2-29: Bump: 400 bumps at 400 m/s ²
Reliability	MI-HDBK 217F, GB (Part-Stress): MTBF >40000 hours (max. 2.5% errors/1000 h)

Specifications – Outdoor Microphone Unit Type 4198

COMPLIANCE WITH STANDARDS

The unit meets IEC 61672 class 1 and ANSI S1.4 Type 2. It also complies with the EMC Directive and Low Voltage Directive (see CE box, below).

MICROPHONE CARTRIDGE

Falcon Range Prepolarized Free-field 1/2" Microphone Type 4189^a

PREAMPLIFIER

Falcon Range 1/2" Microphone Preamplifier Type 2669-C^b

a. See separate product data sheet (BP 1380) or Microphone Handbook (BA5105) for complete specifications for this microphone

SENSITIVITY (250 Hz)

-26 ±2 dB re 1V/Pa, 50 mV/Pa
 (individually calibrated)

FREQUENCY RESPONSE

0° incidence free-field response
 ±1 dB 10 Hz to 8 kHz
 ±2 dB 6.3 Hz to 16 kHz
 In accordance with IEC 61672651 class 1

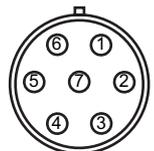
b. See separate product data sheet (BP 1422) for complete specifications for this preamplifier

LOWER LIMITING FREQUENCY (-3 dB)

2 Hz to 4 Hz

DIAPHRAGM RESONANCE FREQUENCY

14 kHz (90° phase shift)

EQUIVALENT AIR VOLUME (101.3 kPa)45 mm³**CALIBRATOR LOAD VOLUME (250Hz)**260 mm³**PIN CONNECTIONS**

Cable's output plug seen from outside

Pin	Signal
1	Calibration input
2	Signal ground
3	Pol. voltage
4	Signal output
5	TEDS data wire
6	Power supply negative & ground
7	Power supply negative & ground
Casing	Connected to instrument chassis

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PISTONPHONE TYPE 4228 CORRECTION

(with DP 0776): 0.00 dB

NOISE LEVEL

15.2 dB (A), 17.4 dB (Lin.)

UPPER LIMIT OF DYNAMIC RANGE

3% distortion: >146 dB SPL

MAXIMUM SOUND PRESSURE LEVEL

158 dB (Peak)

POWER SUPPLY, DUAL

±14 V to ±60 V

POWER SUPPLY, SINGLE

28 V to 120 V

OUTPUT DC OFFSET

≈ 1 V for dual supply, or ≈ 1/2 the voltage of a single supply

POLARIZATION VOLTAGE (EXTERNAL)

0 V

Environmental Specifications**INFLUENCE OF HUMIDITY**

< 0.1 dB at up to 95% RH (non-condensing) and 40°C

WIND NOISE ATTENUATION

> 15 dB (for wind speed up to 120 km/h)

TEMPERATURE COEFFICIENT (250 Hz)

- 0.001 dB/°C, typical (for the range -10° to +50° C (14 to 122°F))

PRESSURE COEFFICIENT (250 Hz)

- 0.010 dB/kPa

VIBRATION SENSITIVITY (<1000 Hz)62.5 dB equivalent SPL for 1 m/s² axial acceleration**MAGNETIC FIELD SENSITIVITY**

6 dB SPL for 80 A/m, 50 Hz field

ESTIMATE LONG-TERM STABILITY

> 1000 years/dB (dry air at 20°C (68°F))

> 40 years/dB (air at 20°C (68°F), 90% RH)

> 1 year/dB (air at 50°C (122°F), 90% RH)

RAIN

Rainproof to IP 44

DURABILITY**Measurement in large city environment before cleaning and drying:** > 4 weeks**Measurement in large city environment before microphone system overhaul:** > 4 months**Physical Characteristics****DIMENSIONS****Height:** 412 mm (16.2")**Diameter (at widest point):** 72 mm (2.8")**WEIGHT**

580 grams (1.3 lb.)

Specifications – Outdoor Microphone Kit UA-1404**Compatible Sound Meters****TYPE 2236 SOUND LEVEL METER**

The Type 4188 microphone (included with Type 2236) must have a sensitivity between -30.5 dB and -28 dB (see "Type 2236 Considerations," above). Preamplifier ZC-0027 (included with Type 2236) is compatible as shipped.

TYPE 2260 SOUND ANALYZER

Preamplifier ZC-0026 and Microphone Type 4189 (both included with the Type 2260) are compatible as shipped.

TYPE 2250 SOUND ANALYZER

Preamplifier ZC-0032 and Microphone Type 4189 (both included with the Type 2250) are compatible as shipped.

Compatible Microphones**TYPES 4188, 4189 AND 4190**

All microphones require a stainless steel replacement grid to meet the specified frequency characteristics. The grid also provides extra protection from corrosion. Two replacement grids are included with UA-1404: one for Microphone Type 4188, the other for Types 4189 and 4190.

Compatible Preamplifiers**TYPE 2669-B/L/C**

Compatible as shipped

TYPE 2671

Compatible as shipped

Standards**ALL RECOMMENDED CONFIGURATIONS**

IEC 61672 class 1 and ANSI S1.4 Type 2
(See configuration chart, Fig. 7)

Windscreen**WIND NOISE ATTENUATION**

> 15 dB (for wind speed up to 120 km/h)

MATERIAL

Windscreen: Open-pored polyurethane foam

Spikes: Stainless steel

Environmental Specifications**OPERATING TEMPERATURE RANGE**

-30 to +150°C (-22 to +302°F)

The actual range will be determined by the preamplifier used.

RAIN

Rainproof to IP 44

DURABILITY

Measurement in large city environment before cleaning and drying:
>4 weeks

Measurement in large city environment before microphone system
overhaul:>4 months

Physical Characteristics

DIMENSIONS

Height: 412 mm (16.2")

Diameter (at widest point): 72 mm (2.8")

WEIGHT

540 grams (1.3 lb.) (empty)

Ordering Information

Type 4198 Includes the following accessories:

Type 4189	Falcon Range Prepolarized Free-field 1/2" Microphone
Type 2669-C	Falcon Range 1/2" Microphone Preamplifier
UA-1404	Outdoor Microphone Kit
AO-0414-D-100	10 m (32.8 ft.) LEMO 1B to LEMO 1B Cable

Spare Parts

DS-0934	Replacement windscreen
UC-5360	Replacement Bird Spikes

Optional Accessories

ZG-0350	LEMO 1B to 7-pin Brüel & Kjær adaptor
UA-0587	Tripod

BNC TO BNC COAXIAL CABLES

For UA-1404 with Type 2671 Preamplifiers
AO-0426-D-100 10 m Single Screened (32.8 ft.)
AO-0087-D-100 10 m Double Screened (32.8 ft.)
Other cable lengths on request.

LEMO 1B TO LEMO 1B CABLES

For Type 4198 and UA-1404 with Preamplifier Type 2669-C
AO-0414-D-030 3 m (9.8 ft.)

Other cable lengths on request.

AR-0014 Flat Cable

LEMO 0B TO LEMO 1B

For UA-1404 with Preamplifiers Type 2669-B/L without the included cable.
AO-0419-D-030 3 m (9.8 ft.) (included with Preamplifier Type 2669-L)
Other cable lengths on request.

LEMO 0B TO BRÜEL & KJÆR CONNECTER

For UA-1404 with Preamplifiers Type 2669-B/L without the included cable.
AO-0428-D-030 3 m (9.8 ft.) (included with Preamplifier Type 2669-B)
Other cable lengths on request.

BRÜEL & KJÆR EXTENSION CABLES

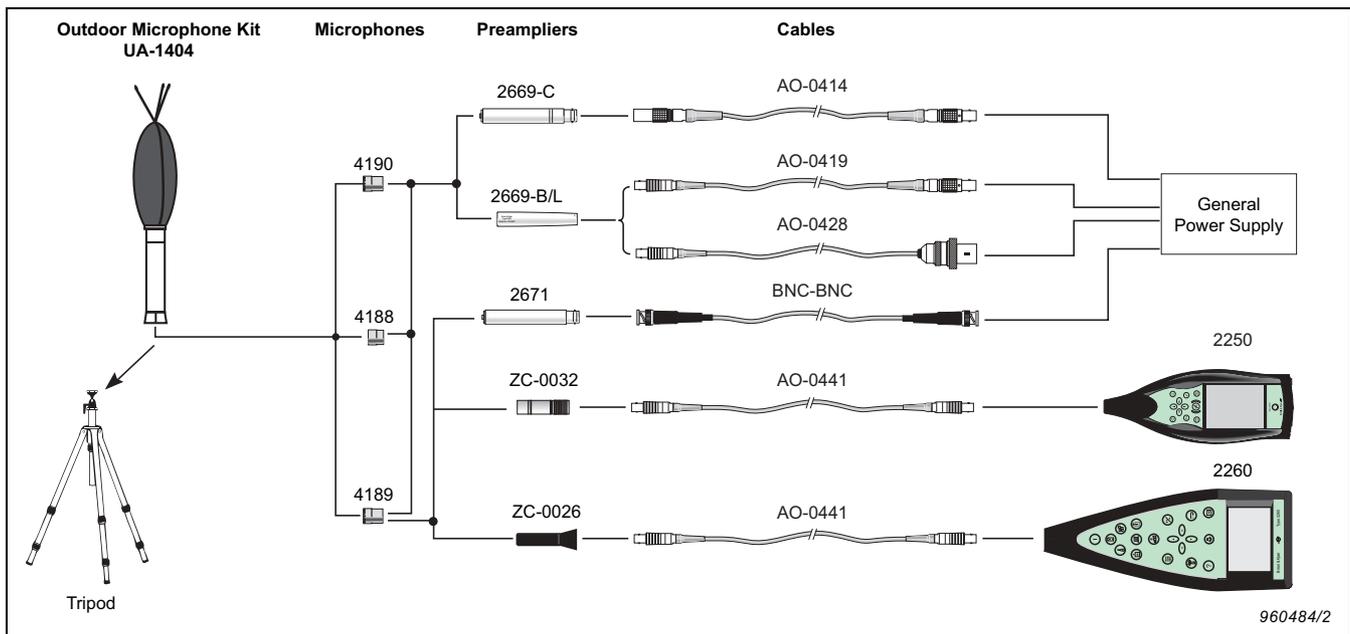
For UA-1404 with Preamplifier Type 2669-B with the included cable (AO-0428).

AO-0027-D-030 3 m (9.8 ft.) Extension Cable
AO-0027-D-100 10 m (32.8 ft.) Extension Cable
AO-0027-M-030 30 m (98.4 ft.) Extension Cable

FOR TYPE 2250 OR 2260 SOUND ANALYZER

AO-0441-D-030 3 m Extension Cable (9.8 ft.)
AO-0441-D-100 10 m Extension Cable (32.8 ft.)

Fig. 7 Outdoor Microphone Kit UA-1404 schematic diagram including connections and cables required for use with compatible microphones and preamplifiers



Brüel & Kjær reserves the right to change specifications and accessories without notice

HEADQUARTERS: DK-2850 Nærum · Denmark · Telephone: +45 4580 0500 · Fax: +45 4580 1405
www.bksv.com · info@bksv.com

Australia (+61) 2 9889-8888 · Austria (+43) 1 865 74 00 · Brazil (+55) 11 5188-8161
Canada (+1) 514 695-8225 · China (+86) 10 680 29906 · Czech Republic (+420) 2 6702 1100
Finland (+358) 9-521 300 · France (+33) 1 69 90 71 00 · Germany (+49) 421 17 87 0
Hong Kong (+852) 2548 7486 · Hungary (+36) 1 215 83 05 · Ireland (+353) 1 807 4083
Italy (+39) 0257 68061 · Japan (+81) 3 5715 1612 · Republic of Korea (+82) 2 3473 0605
Netherlands (+31) 318 55 9290 · Norway (+47) 66 77 11 55 · Poland (+48) 22 816 75 56
Portugal (+351) 21 41 69 040 · Singapore (+65) 6377 4512 · Slovak Republic (+421) 25 443 0701
Spain (+34) 91 659 0820 · Sweden (+46) 33 225 622 · Switzerland (+41) 44 880 7035
Taiwan (+886) 2 2502 7255 · United Kingdom (+44) 14 38 739 000 · USA (+1) 800 332 2040

Local representatives and service organisations worldwide

Brüel & Kjær 

